

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

- 1 1. (Currently amended) A method for learning a generative model for text,
2 comprising:
3 receiving a current model, which contains terminal nodes representing
4 random variables for words and can contain cluster nodes representing clusters of
5 conceptually related words;
6 wherein nodes in the current model are coupled together by weighted
7 links, so that if an incoming link from a node that has fired causes a cluster node
8 in the probabilistic model to fire with a probability proportionate to the weight of
9 the incoming node a cluster node in the probabilistic model fires, an outgoing-a
10 weighted link from the cluster node to another node causes the other node to fire
11 with a probability proportionate to the link weight of the outgoing node,
12 otherwise, the other node does not fire;
13 receiving a set of training documents, wherein each training document
14 contains a set of words; and
15 applying the set of training documents to the current model to produce a
16 new model, wherein applying the set of training documents to the current model
17 involves computing once for each cluster the probabilistic cost of the cluster
18 existing in a document and triggering no words, and for each document applying
19 this cost and subtracting the effects of words that do exist in the document.

1 2. (Original) The method of claim 1, wherein applying the set of training
2 documents to the current model involves:
3 applying the set of training documents to the links defined in the current
4 model to produce functions for weights for corresponding links in the new model;
5 and
6 optimizing the functions to produce weights for links in the new model.

1 3. (Original) The method of claim 2, wherein for a given link, producing
2 functions for a weight on the given link involves:
3 producing a function for the given link for each document in the set of
4 training documents; and
5 multiplying the functions for each document together to produce a
6 function to be optimized for the given link.

1 4. (Original) The method of claim 3, wherein for the given link the
2 function for a document is an approximation of the probability of the document's
3 terminals firing as a function of the weight on the given link, keeping all other
4 link weights in the model constant.

1 5. (Original) The method of claim 1, wherein the method further
2 comprises iteratively:
3 considering the new model to be the current model; and
4 applying training documents to the current model to produce a subsequent
5 new model.

1 6. (Original) The method of claim 5, wherein during an initial iteration, the
2 method further comprises generating an initial current model from a set of words
3 by:

4 generating a universal node that is always active;
5 generating terminal nodes representing words in the set of words; and
6 directly linking the universal node to the terminal nodes.

1 7. (Original) The method of claim 5, wherein each iteration uses twice as
2 many training documents as the previous iteration until all available training
3 documents are used.

1 8. (Original) The method of claim 1, wherein producing the new model
2 additionally involves selectively introducing new links from clusters to nodes and
3 from clusters to clusters.

1 9. (Currently amended) The method of claim 8, wherein introducing a new
2 link involves ~~can involve~~:
3 considering a cluster that is assumed ~~likely~~ to be active in generating a
4 given document;
5 considering a new term in the given document, wherein the new term is
6 not currently associated with the cluster; and
7 adding the new link between the cluster and the new term.

1 10. (Currently amended) The method of claim 8, wherein introducing a
2 new link involves ~~can involve~~:
3 considering a first cluster that is assumed ~~likely~~ to be active in generating a
4 given document;
5 considering a second cluster that is assumed ~~likely~~ to be active in
6 generating the given document, wherein the second cluster is not currently
7 associated with the first cluster; and
8 adding the new link between the first cluster and the second cluster.

1 11. (Original) The method of claim 1, wherein producing the new model
2 additionally involves selectively introducing new cluster nodes into the current
3 model.

1 12. (Original) The method of claim 11, wherein selectively introducing a
2 new cluster node involves:
3 examining a given document;
4 creating the new cluster node;
5 creating links between the new cluster node and terminals in the given
6 document; and
7 creating links between cluster nodes that are likely to have been involved
8 in generating the given document and the new cluster node.

1 13. (Currently amended) The method of claim 1, wherein producing the
2 new model involves calculating an activation for each cluster node in each
3 document, wherein the activation for a given cluster node indicates how many
4 links will ~~are likely to~~ fire from the given cluster node to other nodes.

1 14. (Currently amended) The method of claim 1, wherein producing the
2 new model involves renumbering clusters in the current model to produce a
3 cluster numbering for the new model; and
4 wherein clusters that are ~~likely to be~~ active in generating more documents
5 are assigned lower numbers ~~that occur earlier~~ in an identifier space, whereas
6 clusters that are ~~likely to be~~ active in generating fewer documents are assigned
7 higher numbers ~~that occur later~~ in the identifier space.

1 15. (Original) The method of claim 1, wherein applying a given document
2 to the current model involves:

3 updating a summary variable for each cluster that is likely to be active in
4 the given document, wherein the summary variable summarizes the probabilistic
5 cost of the cluster linking to terminals not existing in the given document; and
6 for terminals that actually do exist in the given document, canceling the
7 effects of corresponding updates to the summary variables.

1 16 (Canceled).

1 17. (Original) The method of claim 1, wherein the probabilistic model
2 includes a universal node that is always active and that has weighted links to
3 terminal nodes and/or cluster nodes.

1 18. (Currently amended) A computer-readable storage medium storing
2 instructions that when executed by a computer cause the computer to perform a
3 method for learning a generative model for text, the method comprising:
4 receiving a current model, which contains terminal nodes representing
5 random variables for words and can contain cluster nodes representing clusters of
6 conceptually related words;
7 wherein nodes in the current model are coupled together by weighted
8 links, so that if an incoming link from a node that has fired causes a cluster node
9 in the probabilistic model to fire with a probability proportionate to the weight of
10 the incoming node ~~a cluster node in the probabilistic model fires, an outgoing-a~~
11 ~~weighted link from the cluster node to another node causes the other node to fire~~
12 with a probability proportionate to the link weight of the outgoing node,
13 otherwise, the other node does not fire;
14 receiving a set of training documents, wherein each training document
15 contains a set of words; and

16 applying the set of training documents to the current model to produce a
17 new model, wherein applying the set of training documents to the current model
18 involves computing once for each cluster the probabilistic cost of the cluster
19 existing in a document and triggering no words, and for each document applying
20 this cost and subtracting the effects of words that do exist in the document.

1 19. (Original) The computer-readable storage medium of claim 18,
2 wherein applying the set of training documents to the current model involves:
3 applying the set of training documents to the links defined in the current
4 model to produce functions for weights for corresponding links in the new model;
5 and
6 optimizing the functions to produce weights for links in the new model.

1 20. (Original) The computer-readable storage medium of claim 19,
2 wherein for a given link, producing functions for a weight on the given link
3 involves:
4 producing a function for the given link for each document in the set of
5 training documents; and
6 multiplying the functions for each document together to produce a
7 function to be optimized for the given link.

1 21. (Original) The computer-readable storage medium of claim 20,
2 wherein for the given link the function for a document is an approximation of the
3 probability of the document's terminals firing as a function of the weight on the
4 given link, keeping all other link weights in the model constant.

1 22. (Original) The computer-readable storage medium of claim 18,
2 wherein the method further comprises iteratively:

3 considering the new model to be the current model; and
4 applying training documents to the current model to produce a subsequent
5 new model.

1 23. (Original) The computer-readable storage medium of claim 22,
2 wherein during an initial iteration, the method further comprises generating an
3 initial current model from a set of words by:
4 generating a universal node that is always active;
5 generating terminal nodes representing words in the set of words; and
6 directly linking the universal node to the terminal nodes.

1 24. (Original) The computer-readable storage medium of claim 22,
2 wherein each iteration uses twice as many training documents as the previous
3 iteration until all available training documents are used.

1 25. (Original) The computer-readable storage medium of claim 18,
2 wherein producing the new model additionally involves selectively introducing
3 new links from clusters to nodes and from clusters to clusters.

1 26. (Original) The computer-readable storage medium of claim 25,
2 wherein introducing a new link can involve:
3 considering a cluster that is likely to be active in generating a given
4 document;
5 considering a new term in the given document, wherein the new term is
6 not associated with the cluster; and
7 adding the new link between the cluster and the new term.

1 27. (Original) The computer-readable storage medium of claim 25,
2 wherein introducing a new link can involve:
3 considering a first cluster that is likely to be active in generating a given
4 document;
5 considering a second cluster that is likely to be active in generating the
6 given document, wherein the second cluster is not associated with the first cluster;
7 and
8 adding the new link between the first cluster and the second cluster.

1 28. (Original) The computer-readable storage medium of claim 18,
2 wherein producing the new model additionally involves selectively introducing
3 new cluster nodes into the current model.

1 29. (Original) The computer-readable storage medium of claim 28,
2 wherein selectively introducing a new cluster node involves:
3 examining a given document;
4 creating the new cluster node;
5 creating links between the new cluster node and terminals in the given
6 document; and
7 creating links between cluster nodes that are likely to have been involved
8 in generating the given document and the new cluster node.

1 30. (Currently amended) The computer-readable storage medium of claim
2 18, wherein producing the new model involves calculating an activation for each
3 cluster node in each document, wherein the activation for a given cluster node
4 | indicates how many links will ~~are likely to~~ fire from the given cluster node to
5 other nodes.

1 31. (Currently amended) The computer-readable storage medium of claim
2 18, wherein producing the new model involves renumbering clusters in the current
3 model to produce a cluster numbering for the new model; and
4 wherein clusters that are ~~likely to be~~ active in generating more documents
5 are assigned lower numbers ~~that occur earlier~~ in an identifier space, whereas
6 clusters that are ~~likely to be~~ active in generating fewer documents are assigned
7 higher numbers ~~that occur later~~ in the identifier space.

1 32. (Original) The computer-readable storage medium of claim 18,
2 wherein applying a given document to the current model involves:
3 updating a summary variable for each cluster that is likely to be active in
4 the given document, wherein the summary variable summarizes the probabilistic
5 cost of the cluster linking to terminals not existing in the given document; and
6 for terminals that actually do exist in the given document, canceling the
7 effects of corresponding updates to the summary variables.

1 33 (Canceled).

1 34. (Original) The computer-readable storage medium of claim 18,
2 wherein the probabilistic model includes a universal node that is always active
3 and that has weighted links to terminal nodes and/or cluster nodes.

1 35. (Currently amended) An apparatus that learns a generative model for
2 text, comprising:
3 a receiving mechanism configured to receive a current model, which
4 contains terminal nodes representing random variables for words and can contain
5 cluster nodes representing clusters of conceptually related words;

6 wherein nodes in the current model are coupled together by weighted
7 | links, so that if an incoming link from a node that has fired causes a cluster node
8 | in the probabilistic model to fire with a probability proportionate to the weight of
9 | the incoming node ~~a cluster node in the probabilistic model fires, an outgoing-a~~
10 | ~~weighted~~ link from the cluster node to another node causes the other node to fire
11 | with a probability proportionate to the ~~link~~ weight of the outgoing node, otherwise
12 | the other node does not fire;

13 wherein the receiving mechanism is configured to receive a set of training
14 | documents, wherein each training document contains a set of words; and

15 a training mechanism configured to apply the set of training documents to
16 | the current model to produce a new model, wherein applying the set of training
17 | documents to the current model involves computing once for each cluster the
18 | probabilistic cost of the cluster existing in a document and triggering no words,
19 | and for each document applying this cost and subtracting the effects of words that
20 | do exist in the document.